Ministry of the Environment
Ministère de l'Environnement
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Technical Update

for Municipal Drinking Water Systems

Drinking Water Testing for Chemical Parameters

The *Safe Drinking Water Act, 2002* requires owners and operating authorities of regulated drinking water systems to ensure that the water provided by the system, to the point where the system is connected to the user's plumbing, meets prescribed drinking water quality standards.

To this end, the Drinking-Water Systems Regulation (O. Reg.170/03) prescribes the testing of drinking water grab samples for chemical parameters. The frequency and type of testing required depends on the category of the drinking water system. The eight categories of drinking water systems are defined in the Regulation. Continuous monitoring equipment at the drinking water system is permitted for testing that is required under the Regulation for turbidity, fluoride, free chlorine residual, and free and total chlorine residual for the purposes of determining combined chlorine residual. In some cases, continuous monitoring is required.

As of October 1, 2003, laboratories were required to obtain a drinking water testing licence issued by the Ministry of the Environment, which authorizes the conduct of the tests. The chemical tests performed must be specified in the licence or the licence must expressly authorize the conduct of the test. Continuous monitoring equipment that is part of the drinking water system is exempt from the requirement for accreditation.

Chemical parameters to be measured

For each category of drinking water system, O. Reg. 170/03 prescribes the type of sample (raw, treated or distribution) that must be collected. The Regulation prescribes the frequency of sampling and the tests that must be performed for each category of drinking water system. As the sample type and the testing frequency varies with the category of drinking water system, it is imperative to consult the Regulation to determine the tests required for a particular system. The prescribed testing in the Regulation will ensure coverage of the necessary health-related parameters identified in the Ontario Drinking-Water Quality Standards (O. Reg. 169/03). In some cases, parameters and concentration limits are also specified in approvals, orders and other directives issued by the Ministry of the Environment.

Sample collection and handling considerations

The laboratory conducting the test is required to provide direction to the drinking water system owner/operator regarding sample collection and handling. The owner/operating authority is required by the Regulation to follow this direction. If the laboratory does not have specific written instructions, it can provide the owner/operating authority with the Ministry of the Environment document, *Practices for the Collection and Handling of Drinking Water Samples* (June 2003).

Aerators, hose attachments, filters and strainers should be removed from taps as they may alter the chemistry of the sample so that it no longer represents the water as supplied by the treatment system. Lines should be flushed for at least 2 to 5 minutes to minimize the effects of local plumbing. A dedicated tap or spigot for regulatory sampling is recommended.

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Sample collection and handling practices are crucial to obtaining valid data. Person(s) collecting the samples should be properly trained with respect to sample handling considerations. The best method for collecting a grab sample is to collect the sample directly into the container provided by the laboratory. In general, plastic bottles are acceptable for the collection of samples for inorganic chemical testing and glass containers are necessary for most organic parameters. Light-proof containers are required for compounds which degrade in the presence of UV-light.

Special sampling techniques are necessary for some tests such as the test for volatile organic compounds. As these compounds vaporize, it is important to exclude air from the sampling container by filling slowly (avoiding turbulence) to overflowing until a convex meniscus (dome) is present. An air bubble should not be present in the container when it has been capped.

Some tests require immediate sample preservation to stabilize the target chemical being analyzed and ensure that its concentration at the time of analysis is the same as at the time of collection. When sample bottles have been pre-charged with a preservative, it is important that the sampler does not rinse the container prior to sample collection or allow the container to overflow while filling it.

Storage and transportation requirements

Preservation may not be an option for some parameters. For perishable parameters, the sample must be received at the laboratory and analyzed within a short period of time. The laboratory must provide expiry times for the various tests. Perishable chemical parameters include nitrate and volatile organic compounds. Samples must be handled and shipped to the laboratory in accordance with directions provided by the laboratory. If ice packs are recommended, and loose ice is used, it should be encased in waterproof packaging or a sealed container to prevent it from contaminating the sample.

Finding a licensed laboratory

The Ministry of the Environment maintains a list of licensed labs with contact information on its Web site at: www.ene.gov.on.ca/envision/water/sdwa/lablicensing.htm

For more information contact:

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